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10/522,779

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Shinji Sakashita

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EXAMINER

VELASQUEZ, VANESSA T

ART UNIT

PAPER NUMBER

1793

NOTIFICATION DATE

DELIVERY MODE

04/10/2009

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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|------------------------------|--------------------------------------|---|--|
| Office Action Summary | Application No. 10/522,779 | Applicant(s) SAKASHITA ET AL. | |
| | Examiner Vanessa Velasquez | Art Unit 1793 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 December 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,7-9,11-13 and 15-18 is/are pending in the application.
- 4a) Of the above claim(s) 15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,7-9,11-13 and 16-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Claims

Claims 3-6, 10, and 14 are canceled. Claim 15 is withdrawn. Claims 16-18 are newly added. Currently, claims 1, 2, 7-9, 11-13, and 16-18 are presented for examination on the merits.

Withdrawal of Duplicate Claims Warning

The warning issued regarding claims 9 and 10 as being duplicates is moot in view of the cancellation of claim 10.

Status of Previous Rejections under 35 USC § 112

The previous rejection of claims 1, 2, and 7-14 under the first paragraph of 35 U.S.C. 112 is withdrawn in view of amendments to the claims.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1, 2, 7-9, 11-13, and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyamoto et al. (EP 1 126 139 A2) in view of Grunke et al. (US 4,936,927) and Lampman ("Wrought Titanium and Titanium Alloys," Vol. 2, ASM Handbook), and further in view of Yao et al. (US 6,066,359).

Regarding claims 1, 11, 13, and 16-18, Miyamoto et al. teach a titanium alloy comprising 0.5-2.3% by mass of aluminum and inevitable impurities with titanium constituting the balance (para. [0009]).

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Still regarding claims 1, 11, 13, and 16-18, Miyamoto et al. do not teach a layer of concentrated aluminum in the titanium alloy. Grunke et al. teach a titanium-aluminum alloy wherein the concentration of aluminum is relatively high near the surface of the alloy and gradually decreases inward toward the bulk portion of the alloy (FIG. 3b; col. 4, lines 1-15). The aluminum acts as a coating that protects the titanium alloy (Grunke et al., col. 1, lines 67-68 to col. 2, line 1). Therefore, it would have been obvious to one of ordinary skill in the art to induce a concentration gradient of aluminum particles in the alloy of Miyamoto et al. because the gradient protects the titanium and avoids sharp changes or discontinuities in the mechanical properties of the alloy (col. 4, lines 10-15).

Still regarding claims 1, 11, 13, and 16-18, Miyamoto et al. in view of Grunke et al. are silent as to the particular concentration of aluminum in the concentrated coating later. However, it is held that discovering an optimum value of a result-effective variable involves only routine skill in the art (MPEP § 2144.05 Section II). In the instant case, Lampman teaches that aluminum enhances the tensile strength, creep strength, and elastic moduli of titanium alloys (page 599, third column, "Aluminum" sub-section). Therefore, the concentration of aluminum in the concentrated layer is a result-effective variable because it directly affects the mechanical properties of titanium metal as stated above. Therefore, it would have been obvious to one of ordinary skill in the art to have optimized the amount of aluminum in a concentrated layer of the alloy of Miyamoto et al. in view of Grunke et al. in order to form a titanium alloy of a desired tensile strength, creep strength, and elastic moduli, as taught by Lampman.

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Still regarding claims 1, 11, 13, and 16-18, Miyamoto et al. in view of Grunke et al. and Lampman are silent as to the presence of an oxide later on top of the concentrated layer. Yao et al., drawn to a method of producing titanium oxide thin film, teach a titanium oxide thin film that is 0.1 micron (100 nm) to 5.0 microns thick (col. 5, lines 50-52) and crystalline (col. 5, lines 44-47). The oxide can be formed on metal substrates (col. 5, lines 1-6) and is corrosion resistant (abstract). Therefore, it would have been obvious to one of ordinary skill in the art to grow a crystalline oxide on the surface of the alloy of Miyamoto et al. in view of Grunke et al. and Lampman because it would enhance the corrosion resistance of the titanium, as taught by Yao et al.

Still regarding claims 1, 11, 13, and 16-18, the limitation “the film being produced by a process comprising oxidizing the Ti-Al alloy” is a product-by-process limitation. It has been well established that “even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself” (MPEP § 2113). It should be noted that in order to grow oxide on Ti-Al alloy, the base Ti-Al alloy itself would necessarily be oxidized in the process regardless of oxidizing method (e.g., solution-based, thermal, oxygen-environment, etc.).

Regarding claim 2, Miyamoto et al. further disclose that “any alloying element other than Al **may be incorporated** [in the titanium alloy] so far as the feature of the present invention is not lost” (emphasis added) ([0009]), which teaches that the titanium alloy of Miyamoto can include some or no impurities. The ranges listed in claim 2 encompass zero percent. Thus, Miyamoto et al. satisfies the limitations of the instant claim.

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Regarding claim 7, the thickness of the aluminum gradient layer is less than 35 microns (Grunke et al., col. 3, line 24), which encompasses the claimed range.

Regarding claim 8, the titanium being in contact with a steel member is in intended use of the alloy and will not be accorded patentable weight. The material with which the alloy is in contact will depend on its placement in an apparatus, machine, building, etc., and this will depend on the use of the alloy.

Regarding claims 9 and 12, the titanium oxide of Yao et al. may be in brookite form (col. 3, lines 23-26, 66-67).

Response to Arguments

5. Applicant's arguments filed December 15, 2008 have been fully considered but they are not persuasive.

Applicant primarily argues that hindsight was used to reject the claimed invention. In response, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Applicant makes remarks concerning the number of reference applied by the Examiner. Applicant acknowledges that any number of references may be used to reject a claim as decided in *In re Gorman*, but argues that the facts of the case in

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Gorman are different from the way the rejection was made in the previous Office action. Applicant states that "[i]n *Gorman*, the PTO applied numerous references, but each reference disclosed a different feature of the claimed article of manufacture." In response, the Examiner fails to see how this differs from the titanium alloy of the present invention. The claimed titanium alloy comprises different features not unlike an article of manufacture. Thus, the argument is found unpersuasive.

Applicant also attacks references individually. In response, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The Applicant comments on why each reference cannot be combined and/or is deficient to teaching the limitations of the claimed invention. Those comments will be addressed below.

With regard to Grunke, Applicant argues that one of ordinary skill in the art would have expected the surface concentration of Al in the Ti-Al of Grunke to be higher than that of the claimed invention. Since Grunke is silent as to a specific surface concentration, the Examiner believes that such an assertion should be supported by evidence. No evidence has been submitted thus far.

With regard to Yao, Applicant argues that the reference is non-analogous art. In response, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for

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rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Yao is reasonably pertinent to the problem of degradation of corrosion resistance that is recognized by Applicant (para. [0029] of the published application). Therefore, Yao qualifies as non-analogous art since the invention of Yao at least solves a problem relevant to that concerning Applicant.

Still with regard to Yao, Applicant argues that the oxide protective film is not applied on the surface of a titanium alloy. In response, Yao clearly states that the oxide may be formed on a metal substrate, not solely ceramics or inorganic fibers as alleged by Applicant. Although the type of metal is not specified, one of ordinary skill in the art would have appreciated that any metal substrate in need of corrosion protection, such as the Ti-Al alloy of Miyamoto et al. (para. [0001]), would be a reasonable choice of substrate on which to grow the protective layer of Yao because of the beneficial results of coating an alloy in need of corrosion protection with a corrosion resistant alloy.

With regard to a mixed oxide, Applicant argues that the prior art of record do not teach a mixed oxide. In response to Applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., a mixed oxide) are not recited in the rejected claim. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

With regard to the process of oxidizing in claim 1, Applicant argues that growing an oxide layer on a Ti-Al alloy would NOT involve oxidizing the alloy itself. The

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Examiner respectfully disagrees. Regardless of the method of oxidation (e.g., solution-based, oxygen atmosphere, air, thermal oxidation), a metal with an oxide layer would necessarily have to have been oxidized because oxidation is the mechanism by which an oxide forms. Applicant points to Yao as evidence that no oxidation could chemically occur from the process therein. A closer review of the reference shows otherwise.

Lines 11-15 and lines 20-26 of column 4 of Yao teach the formation of titanium oxide from the reaction of titanium hexafluoride ion and water. Equation (II) of column 4 shows the chemical equation. Yao specifically teaches that "a thin film comprising TiO_2 is precipitated" from the chemical process described therein (col. 4, lines 19-26). Thus, Yao does in fact teach oxide formation through oxidation.

With regard to hydrogen absorption, Applicant argues that the prior art of record do not recognize the ability to of Ti-Al alloy to resist absorption of hydrogen. In response, the fact that Applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). Given that hydrogen absorption resistance appears to be a property derived from chemical composition, hydrogen absorption resistance would necessarily be a property of an alloy of the prior art of record. Thus, the "difference" between the claimed invention and prior art would have been otherwise obvious due to the expected property.

With regard to Lampman, Applicant argues that the effects of aluminum concentration in Lampman, such as tensile strength, creep strength, and elastic

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moduli, are of no apparent concern, and that accordingly, it would not have been obvious to optimize aluminum. On the contrary, the aforementioned properties are actually quite important in titanium, or even in any metal, to be used in a structural capacity or in any capacity. Naturally, one of ordinary skill in the art would desire that the metal to be used is strong enough to handle a load (sufficient tensile strength), and/or can function without deforming in an elevated-temperature environment (sufficient creep strength), and/or be stiff enough to withstand impact (sufficient elastic modulus). One would be hard pressed to find a metallurgist who did not find the knowledge and determination of these properties essential before placing the metal in service.

With regard to claim 8, Applicant argues that the claim is not intended use. The Examiner respectfully disagrees. The claim is intended use because the alloy of claim 1 could easily be in contact with anything including air, the concrete floor of the warehouse in which it is made and stored, the steel bed of the truck in which it is transported, a human hand, coated paint. The list is endless. The contact of the titanium alloy with another object would not result in the alloy being distinguishable over the prior art.

Note that the reference to Yashiki has not been relied upon because the amendments to the claims no longer require the alumina layer it teaches.

Conclusion

6. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vanessa Velasquez whose telephone number is 571-270-3587. The examiner can normally be reached on Monday-Friday 9:00 AM-6:00 PM ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King, can be reached at 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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